

THE MICROSOFT MONOPOLY IS THREATENED BY THE INTERNET

69. In order to understand the threat that the Internet posed to Microsoft's operating system monopoly, some brief background regarding the relationship between operating systems, applications and the Internet is necessary. While the computer's operating system does not perform the functionality that applications do, it is critical to the proper functioning of those applications. An operating system is the "central nervous system" of a personal computer. It controls the interaction between the computer's processing unit or chip, memory, and attached devices called "peripherals," such as keyboards, disk drives, display monitors, and printers. In addition, the operating system serves as a "platform" from which applications, such as word processing, spreadsheet, financial accounting, browsers, and games can be launched.
70. The operating system is able to serve as a platform because it provides

"system services" that other software developers can use when writing their own software programs. These system services are available through features in the operating system known as application programming interfaces ("APIs"). For example, when a computer user wants to print a word processing document, the word processing software program issues a "call" to a particular API. The operating system will then essentially "instruct" the computer to perform the function associated with the API by causing the microprocessor to carry out the instructions. That same API can be used by any number of programs. For example, the same API that causes a word processing document to be printed can also be used by a programmer writing software for financial accounting or spreadsheets and cause documents created in those applications to be printed.

71. APIs are critically important to software developers. Software developers are the computer programmers who write the variety of applications that run on operating systems. It is those applications that enable computer users to perform the functions they want from their computers. Although Microsoft clearly has the monopoly on personal computer operating systems, there are other operating systems. In addition to Microsoft's several operating systems -- Windows 98, Windows 95, Windows 3.1, and Microsoft Disk Operating System ("MS-DOS") -- there has been over time and continues to exist in the installed base other operating systems with very small market shares, such

as IBM's OS/2 system or Apple's Macintosh system. All of these operating systems have unique APIs. This means that software applications written for one operating system will not run well on any other operating system. For example, software developed and programs written in code for the Windows platform will not run (or at least not run properly) on the Macintosh platform or the OS/2 platform. The fact that applications must be written to specific operating systems is commonly referred to as making the applications "platform dependent," because the ability to run the application, and therefore the utility to the computer user, depends entirely on the underlying operating system. Thus, computer software developers will generally write software that runs on the most ubiquitous operating system. Because of the dominance of Windows, the practical effect is that the vast majority of personal computer applications written today are written to the Windows operating system platform.

72. This technological lock-in has enabled Microsoft to achieve and reinforce its monopoly position in personal computer operating systems. To understand why this is so, it is important to understand that consumers expect that the computers they purchase will be ready to use. That means that, when a consumer brings a personal computer home and opens the box, he or she expects to plug it in, turn it on, and start to work or play. Thus, OEMs ship computers with preinstalled operating systems and a variety of applications

that are chosen by the OEM to add value to the OEM's computer offerings.

Today, well over 90% of the personal computers sold in the world have a Microsoft operating system preinstalled by the OEM. This substantial "installed base" leads to some very predictable results, all inuring to Microsoft's benefit.

73. Independent software vendors, or "ISVs" -- those people who develop and distribute applications software that consumers buy -- understand the reality of the marketplace and recognize that well over 90% of personal computers sold in the world today come with a Microsoft operating system preinstalled. Since applications are platform dependent, ISVs looking at this world quite sensibly write most of their software for the platform with the widest use. That means that most applications are written for the Windows platform.
74. The fact that most of the software applications are written for the Windows platform only reinforces Microsoft's monopoly position in operating systems. Because so much software is written for the Windows platform, consumers who want to take full advantage of their computers and to have the maximum number of choices of applications available continue to purchase machines with a preinstalled Windows operating system. At the same time, the more personal computers sold with Windows operating systems, the more ISVs continue to write applications for the Windows platform. In other words, the sale of computers with Windows operating systems feeds the

development of software for the Windows platform, which in turn, generates additional sales of computers with Windows operating systems. To its credit, Microsoft's early recognition of this type of network effect allowed it to achieve a monopoly in operating systems.

75. ISVs could, of course, write the same applications programs to work on other operating systems, a process referred to in the computer industry as "porting." It is time-consuming and expensive, however, to take a piece of applications software developed for the Windows platform and port it to the OS/2 or Macintosh platform or to some other platform. Moreover, because the market for a product successfully ported to a non-Windows operating system is smaller, there is no guarantee that an ISV can recoup the investment made in porting an application from the Windows platform to another platform. Thus, ISVs have very little economic incentive to spend the resources to port to non-Windows platforms. Again, this further contributes to the dominant and almost impregnable market position Microsoft has obtained in personal computer operating systems.
76. When Netscape entered the "Windows World" as we found it in late 1994 and early 1995, we knew our "window of opportunity" was building the bridge between the platform dependent computer operating system world and the cross-platform environment of the Internet. In fact, we realized that we needed to build an Internet browser that would run not only on all different

personal computer operating systems, but also on non-personal operating systems (UNIX, etc.). Netscape was founded on the principle of making the tremendous amounts of information on the Internet available in an easy-to-use format to the entire market; thus, Netscape founders did not want to arbitrarily exclude UNIX or OS/2 users from the community of people who would be able to reap the benefits of the Internet and the Web. The Netscape engineers came out of an academic environment that favored UNIX, Mac, and OS/2 over Windows. We believed it was important to provide the same level of accessibility to the Internet to people working in these environments as well as to those working with Windows. Thus, the universal nature of the Internet and the commitment to open standards by Netscape and its founders demanded the creation of a cross-platform browser.

77. The development of Internet browser technology, particularly Netscape's Navigator, and the influence it had on the widespread consumer use and acceptance of the Internet provided an opportunity to level a playing field that had been heavily tilted by Microsoft. The Internet is a global network of various individual computer networks linked together. Indeed, its name "Internet" is short for "interlinked networks," and, as commonly used today, refers to separate computer networks that are capable of communicating with one another. The World Wide Web, discussed below, is a portion of the Internet.

78. The Internet's origins date back to the 1970s, when military personnel attempted to ensure that various computer systems in the United States would not be significantly disrupted if a single computer or single connection between two or more computers was destroyed. Rather than establishing a single computer network in which a central computer or computer facility manages the network, the Internet was created as a network of networks.
79. This multiple network structure could function, however, only if the many networks were able to exchange data with one another regardless of the type of computers used by any individual network. To solve this problem, the Internet uses an open standard, known as Transport Control Protocol and Internet Protocol ("TCP/IP"), that enables different computers to communicate with one another. This network of networks got a further boost from the development of hypertext, which allows a computer user to move from one page to another page (also in hypertext) by clicking on highlighted text in the original page. In 1989, researchers adapted hypertext to the Internet by developing Hypertext Markup Language ("HTML") and Hypertext Transport Protocol ("HTTP"). HTML enables one hypertext page to be linked to another anywhere on the Internet, and HTTP manages the transmission of HTML pages. The universe of HTML documents linked together on a network using TCP/IP is what we know as the World Wide Web ("Web").

80. These computing advances allowed previously closed and isolated computer networks to communicate and exchange data with one another.

Theoretically, anyone with a computer could link to this network, but the one missing feature of the Internet was software that allowed average computer users to move or navigate easily through the maze of interlinked computers, to find and access particular HTML pages, and to display them on their computer screens. Netscape helped fill that gap with the development and commercial release of its Internet browser, the Navigator. With the release of the Navigator, the Internet became instantly and widely accessible to the public at large, regardless of which operating system a particular consumer's computer ran. The public responded enthusiastically. From an enterprise (or commercial or organizational customer) perspective, Netscape also generated great enthusiasm because in addition to providing this mechanism to navigate the Web, Netscape ported Navigator to many different platforms, including UNIX, Mac OS, and OS/2. Thus, by adopting and employing Navigator as their Internet browsing software, enterprises could provide their employees with a consistent way to browse the Web or their internal network, regardless of the operating system on a particular user's machine.

81. As stated previously, the initial launch of Navigator in 1994-95 was very successful. By the end of our first year, it was quite clear that Netscape was at the forefront of an emerging and increasingly popular technology.

revolution. Microsoft was late in recognizing the commercial potential of the Internet and the implications that it held for personal computing, but there is very little doubt that development of the Internet and the Web and its accessibility to the large mass of the consuming public, which was made possible in large part by the development of Netscape's browser, posed a serious threat to the Windows operating system monopoly.

82. Netscape's browser, like other software, runs on top of a personal computer operating system. But unlike the typical application, the Netscape browser not only provides a graphical user interface for computer users, but also is a platform from which applications are launched. I am not suggesting that the browser is a replacement for the operating system; Navigator still needs an operating system, such as Windows 98, running underneath it, but Navigator can and does serve as a platform for certain network-centric applications.
83. The development of browser technology opened up a number of important possibilities in the computer industry. While Netscape was developing and commercializing an Internet browser, Sun Microsystems was developing Java, a programming technology. The Java programming technology solves the platform dependency problem that has so long plagued software development. Programs written in Java can be run on any platform that has a Java virtual machine and Java class libraries, which Navigator does.
84. Because Netscape's browser made access to the Internet and the World Wide

Web widely available to the public, it gave ISVs reason to begin writing a number of programs in the Java language, as well as other OS-neutral languages. It also gave ISVs a number of options for how to configure their software. Prior to the development of the Netscape Navigator, most applications software resided on the hard disk of a personal computer. The Windows operating system essentially managed software applications residing on that specific computer. The development of the Navigator, however, gave ISVs the opportunity to distribute their application code in any fashion they chose. For example, all of it could be on the specific computer used by a computer user (known as the "client"), or all of it could be on a centralized computer (known as the "server") that serves a number of personal computers, or some code could be on the server and some on the client. There are other options available as well. For example, software applications could be accessed from the Internet. This flexibility expanded the capability of applications software and made possible new categories of applications.

85. These innovations arising from the development of browser technology, particularly Navigator, were eventually noticed at Microsoft. The possibility of a vast library of applications written in Java or other OS-neutral languages coupled with independent user interfaces and platforms, such as those provided by Navigator, posed a serious threat to the Windows

monopoly. If ISVs began writing a number of programs in such languages, computer users with a browser could launch those programs from the browser platform without regard to the underlying operating system. In other words, it would not matter to the consumer whether the computer had a Windows operating system, Macintosh, OS/2, UNIX, or any other operating system. The rise of the Internet and browser technology, coupled with Java and other new languages, promised the development of "platform independent" software. ISVs would be able to write a program once, and it would run on any computer.

86. At the time I joined Netscape in early 1995, to my knowledge Microsoft had not begun to capitalize on the development of the Internet and the Web. By May 1995, however, as I have learned, Microsoft did recognize the significant threat that the Internet and browsing technology posed to its operating system monopoly.
87. In short, the rise of the Internet, which was heavily promoted by Netscape, the development and commercial success of browser technology in general and Navigator in particular, and the development of Java made possible the day when the specific operating system on a particular computer would no longer be a constraint on the type of software that computer could run. ISVs could avoid expensive "porting" costs and write applications in Java, knowing that they would run on any computer. Computer manufacturers would still

preinstall operating systems, but they would be free to choose the system, be it Windows, OS/2, Macintosh, or some other operating system, that provided optimal performance at the lowest possible cost.

88. These innovations, however, suffered a significant setback because Microsoft engaged in a variety of business practices designed to stifle these developments and to co-opt or crush anyone, including Netscape, that had the temerity to compete with it. The purpose and effect of Microsoft's conduct was to maintain the monopoly position of the Windows operating system.
89. **Browsers Are Applications** – Before I move to the specific actions Microsoft took against Netscape to try to protect and expand Microsoft's monopoly, I think it is important to make one point clear: a browser is a separate product -- an application, essentially like the spreadsheet programs and word processing programs discussed above. While this point seems so clear to me that it should not warrant separate discussion, I have seen it reported that Microsoft claims that its browser product is simply an upgrade to its operating system. Therefore, I must address this issue.
90. Netscape Navigator and Netscape Communicator are indisputably applications or products separate from the operating system; they can not run without an operating system, such as Window 98. Consumers have had no problem appreciating that browsers are separate products. Although our market share has been decreasing, consumers still demand Netscape

Navigator and Netscape Communicator separately from any operating system products. Indeed, Netscape does not sell any operating system products, and was able to sell millions of browser licenses to consumers and enterprises separately from any operating system. Moreover, the industry as a whole recognizes browsers as separate products from operating systems. Browser market share is tracked (separately from operating system market share) by many third party organizations, such as IDC and DataQuest. The "browser wars," referring to the commercial battle between Netscape Navigator and Microsoft Internet Explorer, are frequently reported on in the press. I have seen many product reviews comparing Navigator to Internet Explorer; I have never seen a product review comparing Navigator to any Windows operating system.

91. Significantly, Microsoft also has treated browsers as a separate application from the operating system. To compete with Netscape, Microsoft began offering cross-platform versions of Internet Explorer. These cross-platform versions are separate products from Windows or from any operating system. Indeed, Microsoft still offers a downloadable, stand-alone version of Internet Explorer on the Web, and Microsoft actively promotes its "download Internet Explorer" program. If you look on almost any major web site, you will see a "download Internet Explorer" button -- not a download an "Upgrade to Windows" button. Microsoft also has participated in the "browser wars,"

reporting Internet Explorer's market share on a regular basis, and comparing the features of Internet Explorer to Netscape Navigator or Communicator -- not to any operating system.